SPECIFICATION

[Electronic Version 1.2.8]

[ELECTROMIGRATION CHECK OF SIGNAL NETS USING NET CAPACITANCE TO EVALUATE THERMAL CHARACTERISTICS]

Background of Invention

[0001] FIELD OF THE INVENTION

[0002] The present invention is generally related to the field of integrated circuits, and more particularly related to a method for avoiding excessive local heating that creates electromigration in the metallic interconnects of an integrated circuit device.

[0003] BACKGROUND OF THE INVENTION

[0004] Metallic interconnections of integrated circuit (IC) devices are subject to a degradation phenomena known as electromigration (EM). EM is caused by the electronic interactions of the metal atoms and ions in the conductors of an IC device. EM effects become more prominent as IC feature sizes decrease and as IC frequencies and current densities increase.

[0005] EM in IC devices occurs due to direct current flow. High direct current density in an IC device causes atoms and ions in the conductors of the device to move in the opposite direction of the direct current flow. In particular, when high direct current densities pass through thin conductors, metal ions accumulate in some regions and voids form in other regions of the conductors. The accumulation of metal ions may result in a short circuit to adjacent conductors and the voids may result in an open-circuit condition. However, if the current density can be kept below a predetermined EM threshold, EM can be rendered negligible for the life of any particular IC device. Therefore, EM due to direct current flow in IC devices is a major concern with respect to the potential for device failures and the overall reliability of the device.

[0006] IC devices may also have alternating current flow. The alternating current density in an IC device that results from alternating current flow causes atoms and ions in the conductors of the device to first move in one direction and then move in the opposite direction, back to their original positions. A plurality of conductors with